

REMARKS

The specification has been amended on page 9 to remove reference to "hydrocarbons" in the fourth full paragraph. The addition of hydrocarbons in the list of other substances is clearly erroneous in view of the reference on page 8, last paragraph in which it is stated "The organic compounds to be removed by the invention are hydrocarbon compounds which may contain hydrogen, halogen and oxygen in the molecule structure".

Further, the term "dried" in the last line on page 9 has been replaced by the term "stirred" and on page 10, line 26 "10" has been replaced by "2". Accompanying the response is a translation of Example 1 of the priority document JP 2000-34331 in which it is clearly shown that the errors were either translation errors or typographical errors.

Claims 1, 3 and 9 have been amended to delete "containing" and replace it with the phrase "loaded with". Basis for this limitation may be found on page 6, last paragraph through page 8, line 3 of the specification. Claim 1 has been further amended to add the limitations of Claim 6 therein. Claims 24 and 25 have been amended to delete the phrase "may be" and replace it with the phrase "is/are unsubstituted or". Basis for this limitation may be found on page 8, last paragraph in the specification. No new matter has been added into the specification and amended claims.

REQUEST FOR RECONSIDERATION

Claims 1-5, 7-11 and 13-25 are active in the case.

The rejection of Claims 1-4, 7-10 and 13-25 under 35 U.S.C. §103(a) as unpatentable over Patil et al is traversed.

In view of the amendment to Claim 1, which adds the limitations of Claim 6 therein and the fact that Claim 6 is not subject to a rejection over Patil et al alone, it is considered that this rejection is now moot.

The rejection of Claims 5, 6, 11 and 12 under 35 U.S.C. §103(a) as unpatentable over Patil et al in view of Mizukami et al is traversed.

The Examiner asserts that, because Examples 2, 5 and 6 teach pore distributions of either 108Å or 110Å and that particular specific surface areas are set forth in Table 1, it would be expected that these sharp peaks cover a pore distribution that is within the range of (a-25)Å to (a+25)Å and that the pores would make up at least 65% of the total volume of all the pores. However, the Examiner has not established by any calculations that, in fact, the parameters of amended Claim 1, discussed above, would be met or overlapped in any manner by the materials of Examples 2, 5 and 6 of Mizukami et al. Further, Patil et al and Mizukami et al are both completely silent about the content of rare earth elements in the alumina, as recited in amended Claim 1. In the present invention, the pore size distribution of alumina is important for promoting combustion of organic compounds (see the paragraph bridging pages 5 and 6 of the specification) and a reduced content of rare earth elements in the alumina enables a highly effective combustion of organic compounds to be easily achieved (see page 6, lines 18-20).

Accompanying the response is a Declaration under 37 C.F.R. §1.132 (executed facsimile) which demonstrates the criticality of the pore size distribution of alumina in amended Claim 1. Example 1 shows a catalyst system according to the present invention in

which the first catalyst contains 4.3% Pt on alumina in which the accumulated pore volume of pores having radii of $(a \pm 25)\text{\AA}$ is 90% and a second catalyst of calcium form beta zeolite with 4.3% Pt on alumina also having an accumulated pore volume of 90%. Example 2 according to the present invention has a first catalyst of 1.0% Pt on alumina which has an accumulated pore volume of pores having radii of $(a \pm 25)\text{\AA}$ of 90% and a second catalyst which is the same as the second catalyst for Example 1. The catalysts of Examples 1 and 2 according to the present invention are compared to Comparative Examples 1-5 in which Comparative Example 1 shows a catalyst having 4.3% Pt on alumina having an accumulated pore volume the same as in Example 1 and with no second catalyst.

Comparative Example 2 shows a catalyst in which a calcium beta zeolite with 4.3% Pt on alumina with an accumulated pore volume the same as Example 1 is used as the only catalyst.

Comparative Example 3 shows a second catalyst, prepared as in Example 1, placed in an upstream part of an atmospheric-pressure fixed bed reactor and a first catalyst, prepared as in Example 1, packed in a downstream part of an atmospheric-pressure fixed bed reactor, the opposite arrangement as that set forth in amended Claim 1.

Comparative Example 4 shows a first catalyst having 4.3% Pt on alumina having an accumulated pore volume of pores having radii of $(a \pm 25)\text{\AA}$ of 49% and the second catalyst of calcium form beta zeolite with 4.3% Pt on alumina, also having an accumulated pore volume of 49%.

Comparative Example 5 shows a first catalyst having 4.3% Pt on alumina having an accumulated pore volume of 49% and a second catalyst of calcium form beta zeolite with 4.3% Pt on alumina having an accumulated pore volume of 90%. The arrangements of the catalyst systems in Examples 1, 2, 4 and 5 are first catalyst upstream and second catalyst downstream, as set forth in the present claims.

The catalysts were evaluated by running a gas composition of Table 1 on page 5 of the Declaration through the fixed bed reactor at a flow rate of 360 ml/min., while raising the temperature at a heating rate of 10°C per minute. Table 2 shows temperatures at which 95% and 99% of the total hydrocarbons were converted. The catalyst system of Example 1 shows 95% conversion at 196°C and 99% conversion at 235°C, and the catalyst system of Example 2 shows a 95% conversion at 235°C and a 99% conversion at 272°C. Comparative Example 3, in which the arrangement of catalysts is reversed from that of the present claims shows a 95% conversion at 471°C and a 99% conversion at 482°C. Comparative Example 4, which uses an alumina having an accumulated pore volume outside the range of the present claims in both the first catalyst and the second catalyst, shows a 95% conversion at 280°C and a 99% conversion at 350°C. Comparative Example 5, which uses an alumina having an accumulated pore volume outside the range of the present claims in the first catalyst and alumina within the accumulated pore volume of the present claims in the second catalyst shows a 95% conversion at 275°C and a 99% conversion at 335°C. The superiority of the catalyst systems of the present claims is clearly demonstrated by the much lower temperatures for conversion for Example 1 as compared to the catalyst systems of Comparative Examples 3, 4 and 5, all of which use 4.3% Pt. The catalyst of Example 2, which has 1.0% Pt also shows significantly lower temperatures for 95% and 99% conversions, as compared to Comparative Examples 3, 4 and 5. The claims distinguish over the combination of references.

The rejection of Claims 1-3 under 35 U.S.C. § 102(b) as anticipated by Plank et al is traversed.

Plank et al is silent about the limitation introduced into amended Claim 1 that "the accumulated pore volume of pores having radii in the range of $(a-25)\text{\AA}$ to $(a+25)\text{\AA}$ is at least 65% of the total volume of all the pores." Plank et al is also silent about the content of rare earth elements in the alumina of his catalyst, as set forth in amended Claim 1.

In the present invention the pore size distribution of alumina is important for promoting combustion of organic compounds (see the paragraph bridging pages 5 and 6 of the specification) and a reduced content of rare earth elements in the alumina enables a highly effective combustion of organic compounds to be easily achieved (see page 6, lines 18-20).

Finally, the Declaration under 37 C.F.R. §1.312, discussed above, demonstrates the criticality of the pore size distribution of alumina in producing high conversion of organic compounds at much lower temperatures than those attained by catalysts using alumina outside the pore size distribution of alumina of the present claims. The claims are neither anticipated by nor obvious over Plank et al.

The rejection of Claims 1, 3, 7 and 9 under 35 U.S.C. §112, second paragraph as indefinite is traversed.

The term "containing" has been replaced by the phrase "loaded with", thereby clearly indicating that a platinum group element is not contemplated for the metal of the metal oxide.

The rejection of Claims 15, 24 and 25 under 35 U.S.C. §112, second paragraph as indefinite is traversed.

In view of the deletion of "hydrocarbons" from page 9 of the specification, and the reference to page 8 of the specification, it is submitted that it is now clear what is contemplated by the use of the phrase "organic compound(s)". The phrase "may be" has been substituted by the phrase "is/are unsubstituted or" in Claims 24 and 25, thereby clarifying the scope of Claims 24 and 25. The Claims meet the requirements of 35 U.S.C. §112.

It is submitted that Claims 1-5, 7-11 and 13-25 are allowable and such action is respectfully requested.

Respectfully submitted,

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